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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/775,874

02/10/2004

Colin G. Maher

2003-0694.02

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06/29/2006

LEXMARK INTERNATIONAL, INC.  
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EXAMINER

SOLOMON, LISA

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                                      |                                     |  |
|------------------------------|--------------------------------------|-------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/775,874 | <b>Applicant(s)</b><br>MAHER ET AL. |  |
|                              | <b>Examiner</b><br>Lisa M. Solomon   | <b>Art Unit</b><br>2861             |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-19 is/are allowed.
- 6) ☒ Claim(s) 20, 22-26 and 28-31 is/are rejected.
- 7) ☒ Claim(s) 21 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 20 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torgerson et al. (6,523,935) in view of Komplin et al. (6,106,096) and Mitani et al. (5,697,144).

In regards to claim 20, Torgerson et al. (935') discloses a printhead (100, Fig. 1) for a thermal ink jet printer, the printhead comprising: a semiconductor substrate (11, Fig. 3) containing at least one ink feed edge and a plurality of heater resistors (56, Fig. 4) spaced a distance from the ink feed edge, each of the heater resistors (56, Fig. 4) having a resistance ranging from about 80 to about 200 ohms; a thick film layer attached to the semiconductor substrate, the thick film layer having formed therein a plurality of ink feed chambers (19, Fig. 3) and ink feed channels (29, Fig. 29) corresponding to the plurality of ink ejection actuators; and a nozzle plate (13, Fig. 3) attached to the thick film layer, the nozzle plate containing a plurality of nozzle holes (21, Fig. 3) in the nozzle plate corresponding to the plurality of ink feed chambers (19, Fig. 3), wherein adjacent nozzle holes are spaced apart with a pitch ranging from about 600 to about 2400 dpi and wherein the distance from the ink feed edge is substantially the same for each of the heater resistors [Column 2 lines 54-56; 58-60, Column 3 lines

15-16; 20-22; 33-47]. Torgerson et al. (935') does not disclose whether the film layer is thin or thick.

Komplin et al. (096') teach a printhead including semiconductor substrate, thick polymeric layer capable of containing ink chambers and ink channels, and nozzle plate attached to the polymeric layer [Column 1 lines 50-53; 54-58].

The prior art, Torgerson et al. (935') suggests that the structure of a printhead include a film layer attached to a substrate and then a nozzle plate attached thereupon. Although, the specific thickness of the film layer is not expressed in Torgerson et al. (935') it would be obvious to make this layer thick as is known in the art as shown by Komplin et al. (096') thus one would be motivated to provide a thick film to accommodate the ink flow features [Komplin et al. (096') column 1 lines 57-59].

Torgerson et al. (935') and Komplin et al. (096') do not disclose adjacent nozzle holes spaced apart at a pitch ranging from about 600 to about 2400 dpi.

Mitani et al. (144') teaches a printhead fabrication method that includes forming rows with nozzle holes spaced apart at a pitch of 800 dpi [Column 6 lines 6-8].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the nozzle holes disclosed in Torgerson et al. (935') in combination with Komplin et al. (584') to be spaced apart at a pitch of 800 dpi, which is within the range of 600 to about 2400 dpi for the purposes of producing a printhead with a high nozzle density [Mitani et al. (144') column 6 lines 32-33].

In regards to claims 22-25, Torgerson et al. (935') discloses the ink feed edge comprises an ink feed slot (71), and wherein the plurality of ink ejection actuators (40)

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are disposed on both sides of the ink feed slot (71), the ink feed edge comprises an ink feed slot (71), and wherein the semiconductor substrate (11) contains two or more ink feed slots (71), and the plurality of ink ejection actuators (40) are disposed only on one side of each of the ink feed slots (71) [Column 4 lines 31-32; 35-36; 39-41 and see Fig. 4 elements 40,71]. Torgerson et al. (935') also discloses an inkjet printer cartridge (150,152) using the printhead (154,156) disclosed [Column 10 lines 39-42 and see Fig. 11 elements 150,152 and 154,156].

3. Claims 26 and 28-31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Torgerson et al. (935) in view of Powers et al. (584') and Mitani et al. (5,697,144).

In regards to claim 26, Torgerson et al. (935') discloses a printhead (100, Fig. 1) for a thermal inkjet printer, the printhead comprising: a semiconductor substrate (11, Fig. 3) containing at least one ink feed edge and a plurality of heater resistors (56, Fig. 4) spaced a distance from the ink feed edge, each of the heater resistors having a resistance ranging from about 80 to about 200 ohms; a nozzle plate (13, Fig. 3) attached to the semiconductor substrate, the nozzle plate containing a plurality of nozzle holes (21, Fig. 3), ink chambers (19, Fig. 3) and ink channels (29, Fig. 3) laser ablated in the nozzle plate corresponding to the plurality of ink ejection actuators (40, Fig. 4) wherein adjacent nozzle holes are spaced apart with a pitch ranging from about 600 to about 1200 dpi and wherein the distance from the ink feed edge is substantially the same for each of the heater resistors. [Column 2 lines 54-56; 58-60, Column 3 lines

15-16; 20-22; 33-47, Column 4 lines 53-58; 62-Column 5 line 10]. Torgerson et al. (935') does not disclose the absence of a film layer.

Powers et al. (584') teaches the absence of a thick film layer, a nozzle plate attached to the substrate, and the nozzle plate containing flow features such as ink chambers, ink channels, and nozzles [Column 2 lines 30-41].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the printhead structure of Torgerson et al. (935') by removing the thick film layer and attaching the nozzle plate directly to the substrate as taught by Powers et al. (584') for the purposes of providing a printhead with improved ink flow performance [Powers et al. (584') column 2 lines 64-67].

Torgerson et al. (935') and Powers et al. (584') do not disclose adjacent nozzle holes space apart at a pitch ranging from about 600 to about 1200 dpi.

Mitani et al. (144') teaches a printhead fabrication method that includes forming rows with nozzle holes spaced apart at a pitch of 800 dpi [Column 6 lines 6-8].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the nozzle holes disclosed in Torgerson et al. (935') in combination with Powers et al. (584') to be spaced apart at a pitch of 800 dpi, which is within the range of 600 to about 2400 dpi for the purposes of producing a printhead with a high nozzle density [Mitani et al. (144') column 6 lines 32-33].

In regards to claims 28-31, Torgerson et al. (935') discloses the ink feed edge comprises an ink feed slot (71), and wherein the plurality of ink ejection actuators (40) are disposed on both sides of the ink feed slot (71), the ink feed edge comprises an ink

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feed slot (71), and wherein the semiconductor substrate (11) contains two or more ink feed slots (71), and the plurality of ink ejection actuators (40) are disposed only on one side of each of the ink feed slots (71) [Column 4 lines 31-32; 35-36; 39-41 and see Fig. 4 elements 40,71]. Torgerson et al. (935') also discloses an inkjet printer cartridge (150,152) using the printhead (154,156) disclosed [Column 10 lines 39-42 and see Fig. 11 elements 150,152 and 154,156].

***Allowable Subject Matter***

4. Claims 1-19 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art does not disclose or suggest the claimed "the ink ejection actuators having an aspect ratio ranging from about 1.5:1 to about 6:1" in combination with the remaining claim limitations. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Claims 21 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: In regards to claims 21 and 27, the prior art does not disclose or suggest the claimed "the heater resistors has an aspect ratio ranging from about 1.5:1 to about 6:1' in combination with the remaining claim limitations.

***Response to Arguments***

Applicant's arguments with respect to claims 20, 22-25, 26, and 28-31 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent No. 5,808,640 to Bhasker et al.

Bhasker et al. (640') is cited for its disclosure of the aspect ratio or length-to-width ratio of a heat resistor affecting the resistance of the heater resistor. Bhasker et al. (640') however did not disclose the aspect ratio in the claimed range.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa M. Solomon whose telephone number is (571) 272-1701. The examiner can normally be reached on 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.




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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Lisa M. Solomon  
Patent Examiner  
6/13/2006



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PRIMARY EXAMINER  
06/23/06